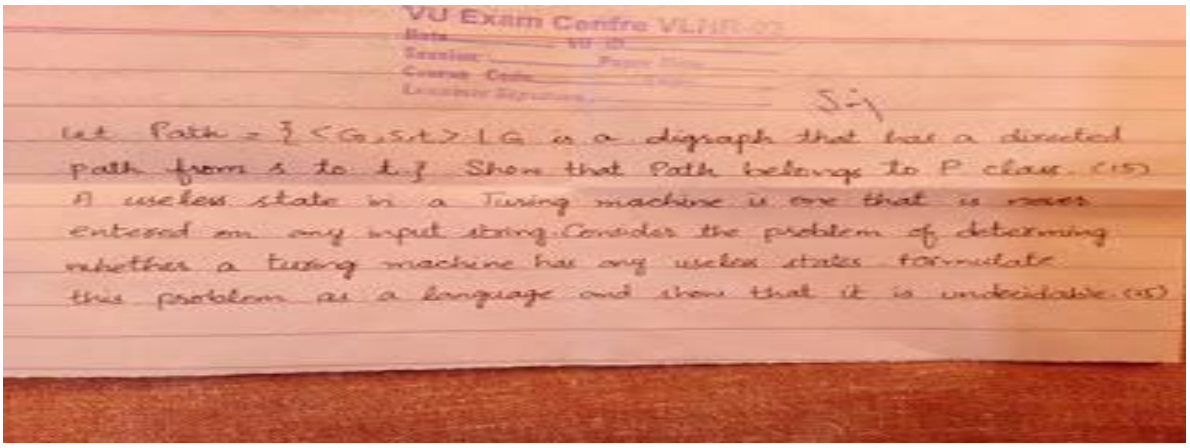

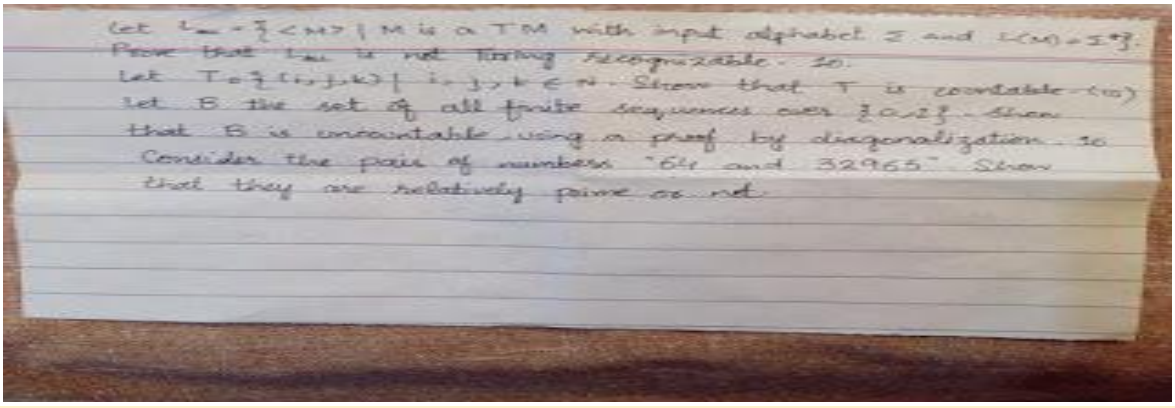

Question 1
Objective Questions [of 10 Marks (I think)]

Question 2
A TM was given and we were to write sequence of configurations for it

Question 3
PCP match question having two parts.
Considering the given instances of Post Correspondence Problem (PCP) we were to tell if it was possible to find a match for every PCP instance. If YES, then we were to give the dominos arrangement which will result in a match. If NO, then prove

Question 4
One question was related to writing implementation description of TM

Question 5
One question was to describe string (0,1)* using diagnolization is countable or not

Q.1 EMPTINESS problem for LBA is decidable ?
1. TRUE
2. FALSE
Q.2 A property that holds for almost all strings also hold incompressible strings ?

1. TRUE
2. FALSE

Q3. For a TM M and string w ={x|x is an acceptable computation History M on w}. Then is decidable ?

1. TRUE
2. FALSE

Q.4 A string x is b-compressible if K(x)>|x|- b ?

1. TRUE
2. FALSE

Q5. If L is decidable Language will also be decidable ? Note(demotes reverse of Language)

1. TRUE
2. FALSE

Q.6 A correspondence or one-to-one correspondence is a function that both one-to-one and onto ?

1. TRUE
2. FALSE

Q.7 Time contains Time (n log n tha ya n)

1. TRUE
2. FALSE

Q.8 If A reduces to B, It is not necessary that compliment of A reduces to compliment of B ?

Q.9 yields ?

1. = Correct Option rest of three are not in mind.

Q.10 Let Which String belongs to L?

1. aabb
2. aabbcccc
3. aaabbccc
4. aabbbccc

Q.11 Consider following instance of Post Correspondence Problem (PCP). Is it possible to find a match for PCP instance given below? If YES, then give the dominos arrangement which will result in a match. If NO, then prove. 05 Marks

Q.12 Consider the sentence, 10 Marks

Let assign "PLUS" TO R, where "PLUS" (a,b,c) is True whenever a+b=c, If "Universe" is R(Real Number). Is this sentence True ? Justify your answer?

Q.13 Consider the pair of numbers 234 and 399. show that they are relatively prime or not ? 10 Marks

Q.14 Prove PCP decidable for unary alphabet 10 Marks

Q.15 Prove that ? 10 Marks

Q.17 Show that Show that the collection of decidable languages is closed under the operation of concatenation. 10 Marks

Q.16 Let t(n) be a function, where . Then every t(n) time nondeterministic single tape TM has an equivalent time deterministic single tape TM. 10 Marks

Q1: let x be the set {1,2,3,4,5} and y be the set {6,7,8,9,10}we describe the functions f:x□y and g:x□y in the following table

n	F(n)		n	G(n)
1	6		1	10
2	7		2	9
3	6		3	8
4	7		4	7
5	6		5	6

Is f onto?justify

Q2:consider the pair of numbers 1274 and 10505 show that they are relatively prime or not?

Q3.let L={<M>!M is a tm and if we start m with a blank input tape then it will finally writes some non blank symbol on its tape} is L decidable?

Q4let LAll={<M>!M is a tm with input alphabet sigma and L(M) = sigma* }prove that LAllis not turing recognizeable.

Q5show that if A is turing reducible to be ,b is turing reducible to c, c is turing reducible to A.

Q6.A useless state in a turing machine is one that is never entered on any input string consider the problem of determining whether a turing machine has any useless states and formulate this problem as a language and show that it is undecidable.

Q7.Let t(n) be a function where t(n)≥n show that every t(n) time k-tape TM has an equivalent O(t2(n)) time single type M.

Q1 one to one function k bary men tha.....
Q2 Batana tha k relative prime hain ya nai 1274 and 10505....
Q3 LALL={<M>/ M is a TM with input alphabet ∑ and L(M)=∑*}
Q4 T={(I,j,k)|I, j , k belong to N} show T is counable.
Q5 PATH ={<G,s,t,k> | G is undirected graph, path between s& t is k }
show krna tha k path class P ko belong krta hy
Q.6. Decidable function k bary men tha... **My today paper**
CS701

Q.7 verify kerna tha k p class belong kerti ha G graph sy...

CS_701 Paper

There were 10 MCQs 10 Marks
Q17
A Turing machine with stay put instead of left is similar to an ordinary Turing machine, but at each
Point the machine can move its head right or let it stay in the same position. Show that this Turing machine variant is

not equivalent to the usual version. What class of languages do these machines recognize? 15 Marks (PROBLEM 3.13 of Sipser book)

Q16

PATH ={< G,s, t>) I G is a directed graph that has a directed path from s to t}. Prove that PATH P.
15 Marks (Theorem 7.14 of Sipser book)

Q15

In the silly Post Correspondence Problem, SPCP, in each pair the top string has the same length as the bottom string. Show that the SPCP is decidable. 10 Marks (PROBLEM 5.15 of Sipser book)

Q14

The collection of provable statements in Th(N,+,x) is Turing-recognizable. 10 Marks (Theorem 6.15 of Sipser book)

Q13 Let MORE= {<A,B>} the language of A is larger than B. Prove that A or B is decideable. Consider either case. 10 Marks (Note : Wording of this question is not 100%)

Q12 Find a match.
05 Marks

Q11 Consider the following pairs of numbers. Show that they are relatively prime or not.
64 and 32965 05 Marks